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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/885,553 | 06/20/2001 | Lars-Peter Heineck | GR 98 P 1379 D | 6319 |

7590 03/15/2004

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| EXAMINER |
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MONDT, JOHANNES P

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| ART UNIT | PAPER NUMBER |
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2826

DATE MAILED: 03/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/885,553

Applicant(s)

HEINECK ET AL.

Examiner

Johannes P Mondt

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☒ Certified copies of the priority documents have been received in Application No. 09/272,968.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/23/2004 has been entered.

Response to Amendment

Amendment filed 1/23/2004 has been entered following aforementioned Request for Continued Examination. In said Amendment all claims have been substantially amended through substantial amendment of claim 1. Claims 1 and 3-8 are in the application, claim 2 having been cancelled previously. Comments on Remarks in said Amendment are included below under "Response to Arguments".

Claim Objections

2. ***Claim 1*** is objected to because of the following informalities: the wording "said side wall" (line 10) should be replaced by "said side walls". Appropriate correction is required.

Double Patenting

3. ***Claim 5*** is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 3. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

4. ***Claim 6*** is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 4. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 102

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

5. **Claims 1, 3 and 5** are rejected under 35 U.S.C. 102(e) as being anticipated by Ahmad (6,037,639). Ahmad teaches (cf. Figure 5 and title, abstract, col. 1, l. 5-10, col. 3, l. 11 – col. 5, l. 50):

a semiconductor substrate 101 (col. 3, l. 19-23) having a substrate surface (upper main surface) (cf. Figure 5), a first conductive region and a second conductive region, namely: source and drain regions 117 (col. 3, l. 37-48);

a gate oxide 108/124 (col. 3, l. 31-37 and col. 4, l. 16-32) disposed on said substrate surface;

a gate 112 (col. 4, l. 16-21) disposed on said gate oxide over an area between said first conductive region and said second conductive region and having side walls adjacent respective ones of said conductive regions (cf. Figure 5);

a silicon oxide passivation layer 136 (col. 5, l. 13-21) disposed on said sidewalls of said gate; and

an insulating silicon nitride spacer 138 (col. 5, l. 44-50) disposed on said silicon oxide passivation layer, said spacer inherently acting as an oxidation barrier by virtue of its material constitution and location (the limitation “said spacer acting as...” constitutes functional language and does not further limit the MOS transistor as device);

said gate oxide insulating said gate from said semiconductor substrate (because said gate oxide is interposed between said gate and said substrate; cf. Figure 5) and having a thickened area 124 (col. 4, l. 16-32) in a region below at least one (in fact both) of said side walls adjacent said conductive regions (cf. Figure 5).

In conclusion, Ahmad anticipates claim 1.

Art Unit: 2826

On claims 3 and 5: said gate by Ahmad includes a layer selected from the group consisting of a tungsten silicide layer and a polysilicon layer, namely: a polysilicon layer 112 (col. 3, l. 31-37). Furthermore, claim 5 is identical to claim 3 (see objection to double patenting formulated above).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2826

7. **Claims 4 and 6** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmad (6,037,639) in view of Sun et al (5,612,249). The reader is referred to the objection to double patenting made above because claim 6 is an identical copy of claim 4. As detailed above, Ahmad anticipates claim 1. Furthermore, Ahmad does teach not only that said gate includes a polysilicon layer 112 (col. 3, l. 31-37) but also a refractory metal silicide layer 114 (col. 3, l. 31-37). Ahmad does not necessarily teach that said refractory metal silicide layer is a tungsten silicide layer. However, (a) tungsten is a refractory metal, i.e., a metal with a high melting point; while, moreover, (b) it would have been obvious to select tungsten as the refractory metal for the refractory metal silicide layer by Ahmad in view of Sun et al, who teach, in a patent on a method of forming field isolation near a poly gate (cf. abstract), hence closely related art, the selection of tungsten (col. 8, l. 13-17) for its relatively low electrical resistivity as the refractory metal in the refractory metal silicide gate layer on top of the polysilicon gate layer 18. *Motivation* to select tungsten as the refractory metal stems from the enhanced conductivity of the gate line (cf. col. 8, l. 13-17), thus reducing ohmic losses and response time.

8. **Claim 7** is rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmad et al and Sun et al as applied to claim 6, and further in view of Krautschneider ((5,854,500). As detailed above, claim 6 is unpatentable over Ahmad in view of Sun et al. Ahmad nor Sun et al necessarily teach the further limitation of claim 7. However, it would have been obvious to include said further limitation in view of Krautschneider: as shown by Krautschneider (front figure), lateral MOS transistors with attributes as taught by Ahmad, particularly with gate oxide 110 (see in Krautschneider column 5, lines 17-26 and column 6, lines 26-27) and nitride side spacers 114 (cf. column 6, lines 45-49), and with a gate of polysilicon (cf. column 5, lines 19-20), for instance, have long been applied as selection transistors to DRAM memory cells (cf. abstract, first sentence), thus constituting an obvious use of the invention by Ahmad. It has to be kept in mind that *motivation* to combine the references also derives from the stated field of application to random access memory devices made by Ahmad (see Ahmad, col. 1, l. 5-10).

Art Unit: 2826

9. **Claim 8** is rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmad et al (6,037,639 B1) in view of Krautschneider ((5,854,500). As detailed above, Ahmad anticipates claim 1. Ahmad does not necessarily teach the further limitation of claim 8. However, it would have been obvious to include said further limitation in view of Krautschneider: as shown by Krautschneider (front figure), lateral MOS transistors with attributes as taught by Ahmad, particularly with gate oxide 110 (see in Krautschneider column 5, lines 17-26 and column 6, lines 26-27) and nitride side spacers 114 (cf. column 6, lines 45-49), and with a gate of polysilicon (cf. column 5, lines 19-20), for instance, have long been applied as selection transistors to DRAM memory cells (cf. abstract, first sentence), thus constituting an obvious use of the invention by Ahmad. It has to be kept in mind that *motivation* to combine the references also derives from the stated field of application to random access memory devices made by Ahmad (see Ahmad, col. 1, l. 5-10).

Response to Arguments

10. Applicant's arguments filed 1/23/04 have been fully considered but they are not persuasive. A review of the prior art in light of the currently claim language has revealed that, counter to Applicant's allegation in Response to Arguments filed 8/29/02, Ahmad (6,037,639) does teach the claimed silicon nitride layer, namely: layer 138, which can be of either silicon nitride or silicon oxide (cf. col. 5, l. 43-50): layer 138 extends over the top as well as down the side of oxide spacer 136 (col. 5, l. 17-21). Ahmad anticipates the currently amended claim 1. The art rejections made above are based on this finding.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Johannes P Mondt whose telephone number is 571-272-1919. The examiner can normally be reached on 8:00 - 18:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

NATHAN J FLYNN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER



JPM
March 4, 2004